

WE CLAIM:

1. An aqueous metal cleaning composition comprising:
 - (a) a major proportion of water;
 - (b) sufficient aqueous soluble acid to obtain a pH less than 6;
 - (c) about 5 to 25 wt% of thiourea; and
 - (d) about 2 to 30 wt% of transition metal salts.
2. The composition of claim 1 wherein the transition metal salt comprises a Group VI(b) metal salt, a Group VIII metal salt or mixtures thereof.
3. The composition of claim 1 wherein the transition metal salt comprises a blend of a first transition metal salt and a blend of a second transition metal salt.
4. The composition of claim 3 wherein the first transition metal salt comprises a Group VI(b) salt and the second transition metal salt comprises a Group VIII(9) salt.
5. The composition of claim 2 wherein the acid comprises nitric acid or hydrochloric acid and transition metal salt comprises a mixed transition metal salt comprising a nitrate or chloride.
6. The composition of claim 1 wherein the concentration of nitric acid is about 10 to about 60 wt%.
7. The composition of claim 1 wherein the concentration of thiourea is about 10 to about 25 wt%.
8. The composition of claim 1 wherein the composition comprises an effective amount of a solvent.

9. The composition of claim 1 wherein the composition comprises and effective amount of a surface active agent for wetting or soil removal.

5 10. An aqueous metal cleaning composition comprising:
(a) a major proportion of water;
(b) sufficient nitric acid to obtain a pH less than 6;
(c) about 5 to 25 wt% of thiourea;
(d) about 2 to 30 wt% of a transition metal salt selected from the group
10 consisting of cobalt salts, rhenium salts, iridium salts or mixtures thereof; and
(e) about 2 to 30 wt% of a transition metal salt selected from the group
consisting of chromium salts, molybdenum salts, tungsten salts or mixtures
thereof.

15 11. The composition of claim 10 wherein the acid is present in the concentration of about 10 to 60 wt%.

12. The composition of claim 10 wherein the thioruea is present in the concentration of about 5 to 25 wt%.

20

13. The composition of claim 10 wherein the composition comprises about 2 to 15 wt% of a chromium nitrate salt and about 2 to 15 wt% of a cobalt nitrate salt.

14. The composition of claim 10 wherein the acid is a mixed acid.

25

15. A method of cleaning metal or metal alloy surfaces with an aqueous metal cleaning composition, the method comprises contacting a soiled metal surface with a composition comprising:

(a) a major proportion of water;
30 (b) about 10 to 40 wt.-% of an aqueous soluble acid to obtain a pH less than 6;

(c) about 5 to 25 wt% of thiourea; and
(d) about 2 to 30 wt% of a cobalt and a chromium transition metal salt;
and removing the soil and used composition.

5 16. The method of claim 15 wherein the composition comprises a blend
nitric acid and hydrochloric acid.

17. The method of claim 16 wherein the composition comprises a mixture of
a transition metal nitrate and a transition metal chloride.

10

18. The method of claim 15 wherein the weight ratio of nitric acid to
hydrochloric acid is about 0.01 to 1:1.

19. The method of claim 15 wherein the concentration of thiourea is about
15 10 to about 25 wt%.

20. An aqueous metal cleaning concentrate composition comprising:
(a) a major proportion of water;
(b) greater than 40 wt.-% aqueous soluble acid;
20 (c) greater than 25 wt% of thiourea; and
(d) greater than 25 wt% of transition metal salt.

21. The composition of claim 20 wherein the transition metal salt comprises
a Group VI(b) metal salt, a Group VIII metal salt or mixtures thereof.

25

22. The composition of claim 20 wherein the transition metal salt comprises
a blend of a first transition metal salt and a blend of a second transition metal salt.

23. The composition of claim 22 wherein the first transition metal salt
30 comprises a Group VI(b) salt and the second transition metal salt comprises a Group
VIII(9).

24. The composition of claim 20 wherein the acid comprises nitric acid, hydrochloric acid and transition metal salt comprises a transition metal nitrate.

5 25. The composition of claim 20 wherein the composition comprises an effective amount of a solvent.

26. The composition of claim 20 wherein the composition comprises and effective amount of a surface active agent for wetting or soil removal.

10